

SCOPUS

THE AVIFAUNA OF MRIMA HILL, SOUTH KENYA COAST

P.L. Britton, H.A. Britton & M.A.C. Coverdale

The sister hills of Mrima and Jombo, with summits only 7 km apart, are imposing subconical landforms rising abruptly from the low-lying coastal plain, some 65 km southwest of Mombasa and only 10 km from the Indian Ocean (Fig. 1). Mrima (height 300 m a.s.l.), and the far smaller Kiruku (190 m) and Nguluku (110 m), are regarded by geologists as satellites of Jombo (470 m). Mrima has received considerable attention from geologists since niobium, manganese and rare earth elements were found there in 1919, though the frequent attempts to exploit these deposits commercially have not been successful (Nyambok 1980). Noting both the endemism and the affinities of its forest flora, botanists have recommended that Mrima be afforded National Park status (Hedberg & Hedberg 1968). The geology of Jombo has been documented and discussed by Baker (1953), Nyambok (1980) and others, but few plants have been collected (M.G. Gilbert, pers. comm.). As far as we are aware, zoologists have totally neglected both hills.

There seems to be general agreement amongst geologists that these two hills (and the smaller satellites) arose from the same igneous activity during the late Jurassic - mid Pliocene. Thus, they may be somewhat older than the other alkaline intrusions of East Africa, including Mt Kenya (Baker 1953). Despite this common origin, from the same magmatic source, Jombo is described by geologists as an alkaline intrusion whereas Mrima is described as a carbonatite intrusion. Gillett (1980) has drawn attention to the extraordinary endemism of the flora of isolated forest patches in coastal Kenya, even when only a short distance apart. With such different soils, it is likely that Jombo and Mrima have significantly different forest flora. However, Moomaw (1960) lumps the forest of the eastern (i.e. wettest) slopes of Jombo with the forest on Mrima, regarding them as a particularly rich relict of the formerly extensive lowland rain forest of the Kenya coast, and having a striking similarity to the forests of the East Usambara Mountains, 70 km to the southwest (in Tanzania). Our own, admittedly superficial, observations support the view that these two forests are structurally similar, and likely to hold similar bird communities, despite the likelihood of substantial differences in the species composition of their flora (and, consequently, of their invertebrate life). In the main, Jombo's other slopes are bushed and wooded rather than forested, though the summit (above 350 m) is apparently mainly forested.

The purpose of this paper is to draw attention to these two important yet neglected forest areas, potentially of great interest to biologists, and to record our observations on the forest birds of Mrima. We do not feel able to investigate the far less accessible forested slopes of Jombo, nor other south coast forests such as Buda, Gongoni and Muhaka, but we hope that others with

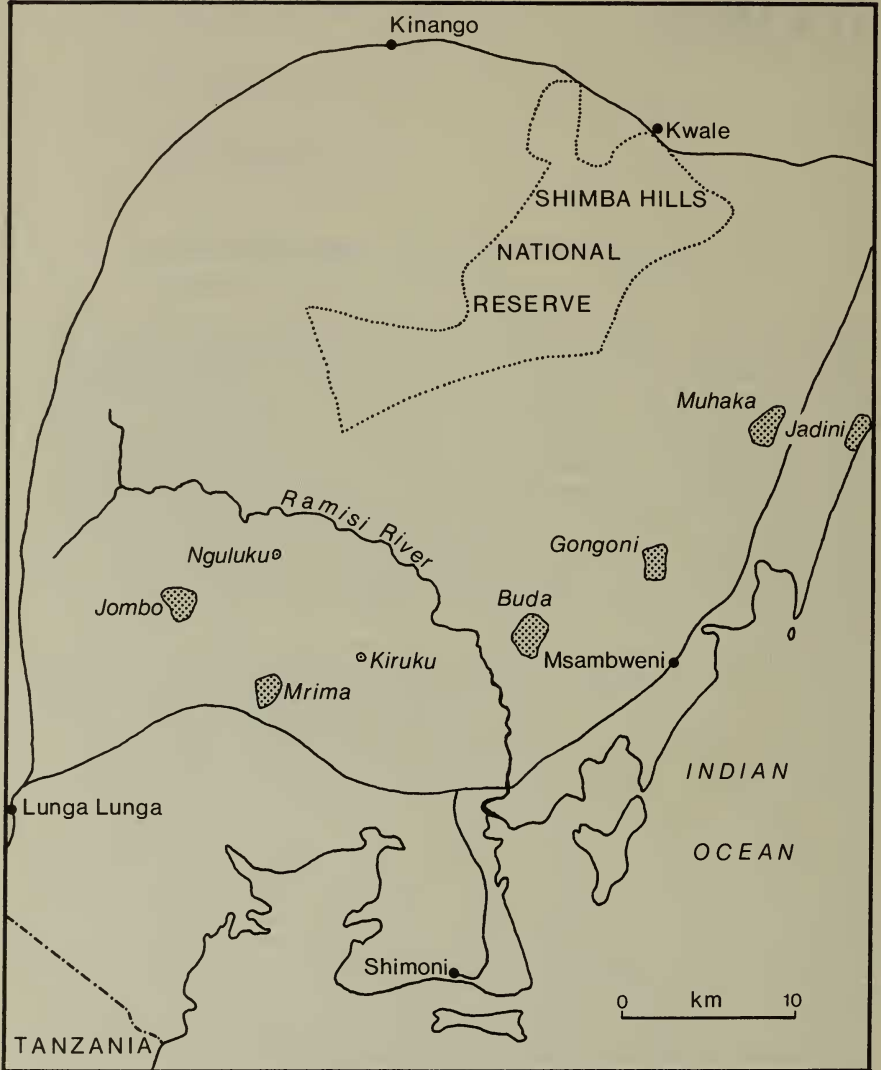


Fig. 1. Coastal forests (stippled) south of Mombasa, Kenya

sufficient time and resources might be encouraged to do so in the future. The Jombo-Mrima complex is in urgent need of a thorough survey of its flora and fauna, in particular Mrima, where geological exploration is due to begin again in January 1981. Any commercial exploitation of its minerals will inevitably result in massive destruction of its flora and fauna.

TABLE 1

Species mist-netted at Mrima, Jadini and Shimoni, south Kenya coast.
Species marked with an asterisk were recorded but not caught.

	Mrima	Jadini	Shimoni
<i>Accipiter minullus</i> Little Sparrowhawk	1	*	
<i>A. tachiro</i> African Goshawk	1	*	*
<i>Turtur tympanistria</i> Tambourine Dove	2	*	*
<i>Cercococcyx montanus</i> Barred Long-tailed Cuckoo		*	1
<i>Apaloderma narina</i> Narina's Trogon	*	*	1
<i>Halcyon senegalensis</i> Mangrove Kingfisher		*	1
<i>Ispidina picta</i> Pygmy Kingfisher		11	3
<i>Pogoniulus bilineatus</i> Golden-rumped Tinkerbird	*	1	*
<i>Andropadus virens</i> Little Greenbul	13	3	2
<i>Chlorocichla flaviventris</i> Yellow-bellied Greenbul	2	*	4
<i>Nicator chloris</i> Nicator	*	2	2
<i>Phyllastrephus debilis</i> Tiny Greenbul	15		
<i>P. fischeri</i> Fischer's Greenbul	22	1	1
<i>P. terrestris</i> Brownbul	9	*	
<i>Cercotrichas quadrivirgata</i> Eastern Bearded Scrub Robin	*	2	5
<i>Cossypha natalensis</i> Red-capped Robin Chat	14	24	17
<i>Neocossyphus rufus</i> Red-tailed Ant Thrush	2	*	*
<i>Pogonocichla stellata</i> White-starred Forest Robin	4		
<i>Turdus fischeri</i> Spotted Ground Thrush	2	3	1
<i>T. gurneyi</i> Orange Ground Thrush	2		
<i>Camaroptera brachyura</i> Grey-backed Camaroptera	3	3	1
<i>Muscicapa caeruleascens</i> Ashy Flycatcher	*	2	*
<i>Batis mixta</i> Forest Batis	4	*	3
<i>Erythrocerus holochlorus</i> Little Yellow Flycatcher	*	2	
<i>Terpsiphone viridis</i> Paradise Flycatcher	*	4	3
<i>Trochocercus cyanomelas</i> Crested Flycatcher	1	*	
<i>Anthreptes collaris</i> Collared Sunbird	*	2	*
<i>A. reichenowi</i> Plain-backed Sunbird	2	3	
<i>Nectarinia olivacea</i> Olive Sunbird	13	6	5
<i>Hypargos niveoguttatus</i> Peters' Twinspot	3	*	4
<i>Mandingoa nitidula</i> Green-backed Twinspot	4		1
Total	124	69	55

THE AVIFAUNA

Birds netted in forest at Mrima (at about 260-280 m a.s.l.) during May-September 1980 are detailed in Table 1, together with samples of birds netted at two other south coast forests (same months, same or different years). Each of the three samples refers to 18m mist-nets set for approximately 400 net-hours, and including four morning (from dawn) captures. Sight records from Mrima are from similar altitudes during February-October 1980. Some sight records are included in Table 1. Other species recorded in or over forest at Mrima are:

Harrier Hawk *Polyboroides radiatus*, Ayres' Hawk Eagle *Hieraaetus dubius*, Martial Eagle *Polemaetus bellicosus*, Crowned Eagle *Stephanoaetus coronatus*, African Hobby *Falco cuvieri*, Kenya Crested Guinea-fowl *Guttera pucherani*, Bronze-naped Pigeon *Columba delegorguei*, Green Pigeon *Treron australis*, Fischer's Turaco *Tauraco fischeri*, Klaas' Cuckoo *Chrysococcyx klaas*, African Wood Owl *Ciccaba woodfordii*, Mottled Swift *Apus aequatorialis*,

Böhm's Spinetail *Neafrapus boehmi*, Mottle-throated Spinetail *Telacanthura ussheri*, Green Wood Hoopoe *Phoeniculus purpureus*, Silvery-cheeked Hornbill *Bycanistes brevis*, Trumpeter Hornbill *B. bucinator*, Crowned Hornbill *Tockus alboterminatus*, Green Barbet *Buccanodon olivaceum*, Green Tinkerbird *Pogonius simplex*, Scaly-throated Honeyguide *Indicator variegatus*, Golden-tailed Woodpecker *Campethera abingoni*, Little-spotted Woodpecker *C. cailliautii*, African Broadbill *Smithornis capensis*, African Golden Oriole *Oriolus auratus*, Black Cuckoo Shrike *Campephaga flava*, Black-headed Apalis *Apalis melanocephala*, Tropical Boubou *Laniarius ferrugineus*, Retz's Helmet Shrike *Prionops retzii*, Chestnut-fronted Helmet Shrike *P. scopifrons*, Black-bellied Glossy Starling *Lamprotornis corruscus*, Dark-backed Weaver *Ploceus bicolor*.

Most of the 61 species recorded from forest at Mrima are wide-ranging in suitable habitat in coastal Kenya. It is worthwhile giving fuller details for the following:

Falco cuvieri Once, 20 September. Hardly recorded in coastal Kenya.
Apus aequatorialis Once, 2 June, perhaps a wanderer. Known from the East Usambaras, Tanzania, but not from Kenya east of Voi and Maungu.
Pogonochlora stellata Adults on 2 August (seen well), 3 August (netted); very young spotted immatures netted on 2 August, 3 August and 20 September. Following the racial arrangement of White (1962b), which differs from that of Mackworth-Praed & Grant (1960), handled birds were referred to the race *orientalis*, which is widespread in the highlands of eastern Tanzania north to the Usambaras, but not previously recorded from Kenya. Other populations in southeast Kenya are referred to *helleri* (Taita Hills and Kasigau as well as the Pare Mountains and Lossogonoi in Tanzania) or the Chyulu Hills endemic *macarthuri* (Britton 1980). In East Africa this is a bird of highland forest, typically above 1600 m, but occurring below 1000 m (at least seasonally) in parts of eastern Tanzania.
Turdus gurneyi Adults netted on 2 June and 3 August, several birds singing on 2 June (identified by R.A.M. McVicker), one seen well on 4 October. This represents a remarkable extension of known range of the race *otomitra*, otherwise known in Kenya from the Taita Hills, and a highland species throughout its East African range, exceptionally as low as 1000 m in the atypical East Usambara Mountains (Britton 1980). It is noteworthy that one of two *T. fischeri* netted at Mrima was caught in the same 50 m line of nets on the same morning as the second *T. gurneyi*. Weights (g) of these two species were: *gurneyi* 48.2, 58; *fischeri* 57, 62.

DISCUSSION

Most of the 61 species recorded in or over forest at Mrima Hill are typical of lowland rain forest in coastal Kenya. Sokoke Forest, 150 km to the northeast, is the only forest in coastal Kenya for which a complete list of bird species is available (Britton & Zimmerman 1979), but samples of netted birds are available for several other forests in coastal Kenya and eastern Tanzania. Sorensen's Index of Similarity, ranging from 0 for two samples with no species in common, to 1 for samples with all species in common (Southwood 1971), has been calculated for samples from various forests (Table 2). These samples of undergrowth and ground-stratum species suggest that the Mrima avifauna is more similar to that of forested habitats at Sokoke than it is to the geographically closer forests at Shimoni, Jadini and Amani.

Moomaw (1960) describes the forests at Shimoni and Jadini as lowland dry forest on coral rag. The virtual absence of pycnonotids of the genus *Phyllastrephus*, so well represented at Mrima, is noteworthy. These coral rag forests lack the thick and diverse undergrowth layer characteristic of lowland rain forest in coastal Kenya, and indices of diversity are particularly low.

TABLE 2

Sorensen's Index of Similarity for samples of mist-netted birds from various forests in coastal Kenya and eastern Tanzania.

M/Sh	M/J	M/S1	M/S2	M/S4
0.526	0.444	0.619	0.517	0.622
M/As	M/Af	M/Pugu	J/Sh	
0.440	0.280	0.353	0.625	

Notes: M = Mrima, J = Jadini, Sh = Shimoni

S1, S2 and S4 are Sokoke Forest habitats; data from Britton & Zimmerman (1979) for their habitats 1, 2 and 4 respectively.

As and Af are data from Stuart & Hutton (1977) for Amani secondary forest and Amani virgin forest, East Usambara Mountains.

Data from the Pugu Hills, coastal Tanzania, are from Stuart & van der Willigen (1978).

Their avifaunas are similar (Tables 1 and 2). For this same Shimoni sample, detailed in Table 1, Britton & Zimmerman (1979) calculated an index of diversity of 0.863 (17 species), lower than for any other sample considered by them (using index A of Britton 1978). The same index, for samples in Table 1, gives 0.830 (15 species) for Jadini and 0.906 (21 species) for Mrima (cf. 0.915 - 0.921, 21 to 23 species, for forest habitats at Sokoke, on a scale of increasing diversity from 0 to 1). The Amani samples in Table 2 are from the East Usambaras at 900-1000 m. No sample is available from lowland forest near Amani.

Good quantitative data are not available for the geographically close forests of Buda, Gongoni, Muhaka and the Shimba Hills (Fig.1), though the data in Britton (1972, 1980) show that the genus *Phyllastrephus* is well represented in each of these south coast forests. It would be instructive to compare the avifaunas of these various lowland rain forests south of Mombasa. The preliminary list of woody plants in the Kenya coastal forests given by Hedberg & Hedberg (1968) includes 63 species for Mrima, of which 9 are given for Sokoke (out of 70) and 18 are given for the Shimba Hills (out of 126). The extraordinary lack of species in common suggests that the forests at Mrima and the geographically close lowland rain forests of the Shimba Hills have little affinity, though Sorensen's Index of Similarity is 0.190 for the woody plants of these two areas compared with 0.136 for Mrima/Sokoke. Hedberg & Hedberg (1968) mention three distinct floristic elements at Mrima: species of the East African coastal forests; a lowland forest element linked to that of the Usambaras, the Ulugurus and Gazaland; and an endemic element.

The most noteworthy feature of the Mrima avifauna is the presence of the two forest thrushes *Pogonocichla stellata* and *Turdus gurneyi*, both of which are otherwise montane in East Africa. There is no reason to suppose that these are transient populations involving wanderers, though they are presumably derived from wanderers from one of the eastern highland blocks, most probably the Usambara Mountains (East or West). Altitudinal movements are documented for *P. stellata* in Zambia and Malawi (Benson, Brooke, Dowsett & Irwin 1971, Benson & Benson 1977), but there is no evidence that *T. gurneyi* is other than sedentary. However, Hall & Moreau (1970) remarked on the comparative lack of subspeciation in *T. gurneyi*, and it was a similar lack of subspeciation in East African populations of *P. stellata* south of 5°S (i.e. *orientalis*) which led Britton (1980) to suggest that birds might wander (or migrate altitudinally)

in eastern Tanzania. In Africa as a whole, White (1962b) recognizes nine races of *P. stellata* and six of *T. gurneyi*, yet he recognizes no subspeciation in the populations of either species in much of the 'Tanganyika-Nyasa' highland area. This lack of subspeciation in this large tract of eastern Africa, from the Nyika Plateau in Zambia and Malawi north to the Usambaras (and beyond for *T. gurneyi*), suggests that some populations are not sedentary, for there is presumably gene-flow between these isolated highland blocks.

Along with other parts of the Ramisi Valley and the southern slopes of the Shimba Hills, Mrima Hill receives the highest average rainfall in coastal Kenya. Moomaw (1960) has remarked on the combination of fertile soil and high precipitation at Mrima, which allows a rich form of lowland rain forest to flourish, despite a pronounced dry season. Though lowland, Mrima has the 'feel' of a highland forest, quite different from the comparatively dry Sokoke Forest. Until very recently, when land was cleared for settlement, the forest on Mrima Hill was more or less contiguous with forests to the north and east, remnants of which still survive in swampy parts of the Ramisi Valley. Evidently, some typically highland bird species are able to flourish at Mrima, whereas they have not apparently spread to forested parts of the coastal plain surrounding the hill.

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- P.L. & H.A. Britton, Box 90163 Mombasa & M.A.C. Coverdale, P.O. Ukunda
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